

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

Claims 1-36 (Canceled)

37. (New) A method for hydrothermal treatment of a reactant comprising the steps of:

providing a vessel, said vessel having a wall and defining a chamber, said wall having a liner formed with a porous layer and a non-porous layer, said non-porous layer sealed to said wall to encapsulate said porous layer therebetween;

introducing the reactant, an oxidizer and water into said chamber;

converting said reactant into reaction products by combining said reactant said oxidizer and said water together in said chamber; and

pumping a heat transfer fluid through said porous material to maintain a pre-selected temperature for the liner.

38. (New) A method as recited in claim 37 wherein said pumping step is performed before said converting step to pre-heat said chamber.

39. (New) A method as recited in claim 37 wherein said pumping step is performed during said converting step to cool said reactor vessel.

40. (New) A method as recited in claim 37 wherein said pumping step is performed during said converting step to cool said non-porous layer of said liner.

41. (New) A method as recited in claim 37 wherein said pumping step is performed during said converting step to recover heat generated from said converting step.

42. (New) A method as recited in claim 37 wherein said pumping step is performed after said converting step to cool said liner to remove said liner from said vessel.

43. (New) A method as recited in claim 37 wherein said converting step occurs at a temperature of at least 374 degrees Celsius and a pressure of at least 25 bar.

44. (New) A method as recited in claim 37 wherein said converting step occurs at a temperature of at least 374 degrees Celsius and a pressure of at least 220 bar.

45. (New) A method for hydrothermal treatment of a reactant comprising the steps of:

- providing a hydrothermal pressure vessel having a vessel wall defining a chamber;

- locating a liner within the chamber of the vessel, said liner including a non-porous layer and a porous layer, with the porous layer being positioned between the non-porous layer and the vessel wall;

- coupling the non-porous layer to the vessel wall to encapsulate the porous layer therebetween;

- establishing fluid communication between the porous layer and a pump;

- operating the pump to continuously pass a heat transfer fluid through the porous layer to control the temperature of the non-porous layer; and

- reacting the reactant within the chamber.

46. (New) A method as recited in claim 45 wherein the operating step includes cooling the non-porous layer to reduce accumulation of insoluble salts on the liner.

47. (New) A method as recited in claim 45 wherein the operating step includes heating the non-porous layer to pre-heat the chamber before steady state treatment conditions in the chamber are achieved.

48. (New) A method as recited in claim 45 further comprising the steps of:
extending at least one connector through the vessel wall and into contact with the porous layer to record operational information; and
conveying the operational information from the porous layer.

49. (New) A method as recited in claim 45 further comprising the step of monitoring the pressure in the porous layer.

50. (New) A method as recited in claim 45 further comprising the step of determining the presence of a chemical species in the porous layer.

51. (New) A method as recited in claim 45 further comprising the step of determining the flow of the heat transfer fluid through the porous layer.

52. (New) A method as recited in claim 45 further comprising the step of positioning at least one partition between the non-porous layer and the vessel wall to divide the porous layer into sections and to isolate the sections from each other.

53. (New) A method as recited in claim 45 wherein the liner includes an insulation layer, and wherein, during the locating step, the insulation layer is positioned adjacent the vessel wall between the porous layer and the vessel wall.

54. (New) A method for hydrothermal treatment of a reactant comprising the steps of:

- providing a hydrothermal pressure vessel having a vessel wall with an outer surface and an inner surface defining a chamber;

- positioning a porous layer in the chamber of the vessel;

- locating a non-porous layer against the porous layer, with the porous layer being between the non-porous layer and the vessel wall;

- coupling the non-porous layer to the vessel wall to encapsulate the porous layer therebetween;

- connecting an inlet connector and an outlet connector to the porous layer to establish fluid communication with the porous layer, with said inlet connector, outlet connector and porous layer defining a passageway for a heat transfer fluid;

- selectively pumping the heat transfer fluid through the passageway to control the temperature of the non-porous layer;

- limiting flow of the heat transfer fluid to the passageway; and

- reacting the reactant within the chamber.

55. (New) A method as recited in claim 54 wherein the selectively pumping step includes cooling the non-porous layer to reduce accumulation of insoluble salts on the non-porous layer.

56. (New) A method as recited in claim 54 wherein the selectively pumping step includes heating the non-porous layer to pre-heat the chamber before steady state treatment conditions in the chamber are achieved.